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U.S. Department
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PESTS NOT KNOWN TO OCCUR IN THE UNITED STATES OR OF LIMITED
DISTRIBUTION, NO. 61: SOUTH AFRICAN CARNATION TORTRIX

APHIS-PPQ

APHIS 81-46
September 1985

Pest

SOUTH AFRICAN CARNATION TORTRIX
Epichoristodes acerbella (Walker)

Selected
Synonymy

Depressaria acerbella Walker, 1864, List Lepid. Het. Brit. Mus.
29:564
Tortrix acerbella Meyrick, 1912, Lepid. Catal., 10:33
Tortrix iocoma Meyrick, 1908, Proc. Zool. Soc. Lond.:723
Epichorista iocoma Clarke, 1955, Meyrick Microlepidoptera,
3:115, pl. 57, figs. 1-1b
Proselana ionephela Meyrick, 1909, Ann. S. Afr. Mus. 5:350
Epichorista ionephela Meyrick, 1911, Ann. Transv. Mus., 2:224
Epichoristodes acerbella Diakonoff, 1960, Verh. Ned. Akad.
Wet. Amsterdam 53:175

Order: Family

Lepidoptera: Tortricidae

Economic
Importance

In South Africa, Epichoristodes acerbella is one of the major pests of commercially grown carnations (Bolton 1979). Mediterranean cultivars are more susceptible than American ones (European and Mediterranean Plant Protection Organization 1979). This species damages all parts of the plants except the roots, reducing the production and quality of cut flowers. During the 1960's when the market for South African carnation cuttings and cut flowers was extended to Europe, control of E. acerbella became more important because of quarantine regulations there (Bolton 1979).

On pears in South Africa, the only economic damage is due to surface feeding on the fruit itself. On susceptible varieties, as much as 30 percent of the fruits are blemished, rendering them completely unfit for packing and long-term storage (Basson and Myburgh 1960).

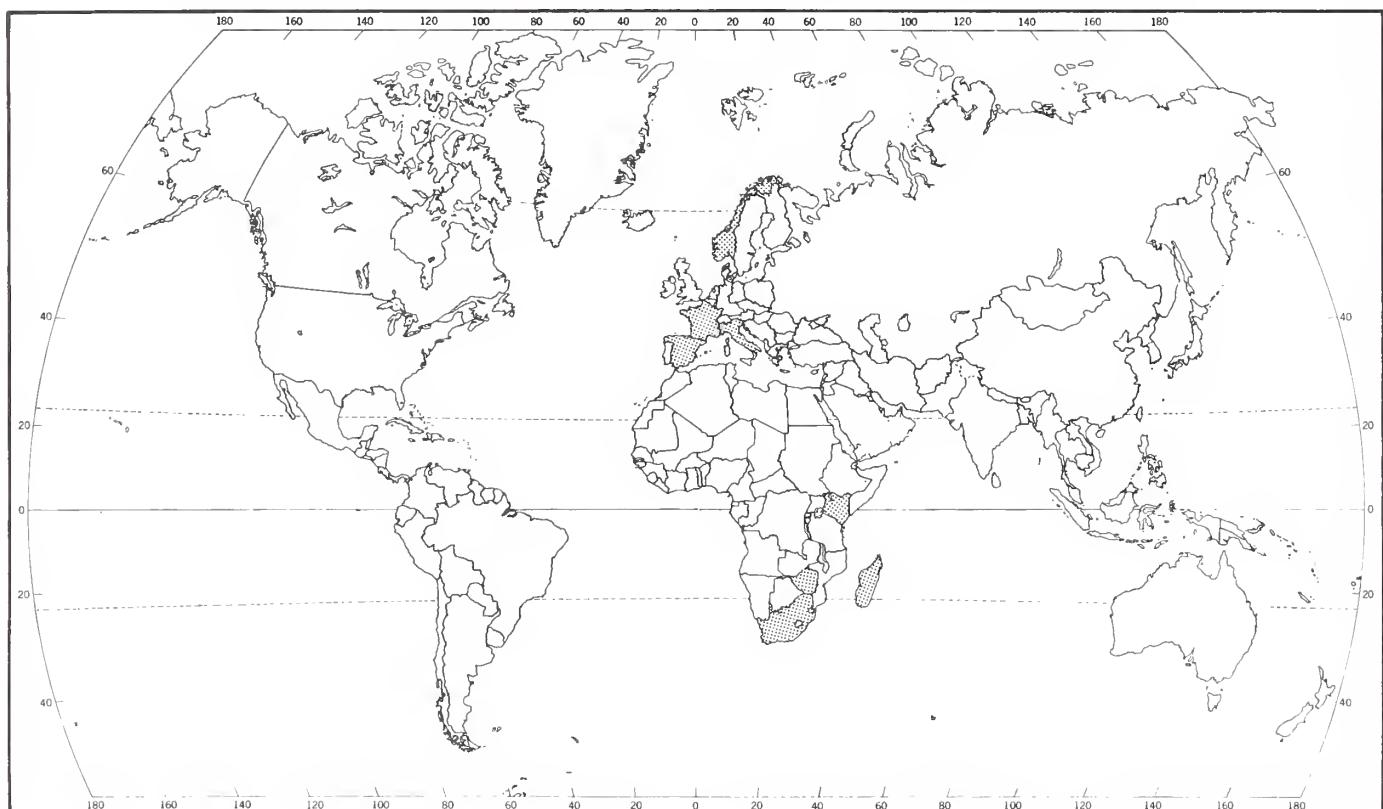
Hosts

E. acerbella infests various species of cultivated and wild plants. Weeds serve as alternate hosts during winter. The recorded host list includes Arctotheca sp., Centranthus ruber (red valerian), Chrysanthemum morifolium (florist's chrysanthemum), Cryptostemma spp., Cucurbita spp. (pumpkin), Dianthus caryophyllus (carnation), Erigeron sp., Fragaria chiloensis (Chilean strawberry), Helichrysum bojerianum, Hypochoeris radicata (spotted cat's-ear), Malus sylvestris (apple), Medicago sativa (alfalfa), Ornithogalum thrysoides (chincherinchee), Oxalis acetosella, Pelargonium sp. (geranium), Prunus domestica (plum), Pyrus sp. (pear), Raphanus raphanistrum (wild radish), Rhamnus sp., Rosa sp. (rose), Rumex

acetosella (sorrel), and Sonchus sp. (sowthistle) (Albajes et al. 1979, Bolton 1979, d'Aguilar and Deportes 1974, Dickson 1945, European and Mediterranean Plant Protection Organization 1979, Fenili 1977, Fjelddalen 1965, Pelham-Clinton 1969, Taylor 1957, and Zangheri and Cavalloro 1971).

General
Distribution

This species occurs in Africa: Kenya, Madagascar, South Africa (European and Mediterranean Plant Protection Organization 1979), and Zimbabwe (Chorley 1944) and in Europe: France, Italy (Kollner 1976), Spain (Costa-Seglar 1976), and greenhouses in Norway (Fjelddalen 1965).



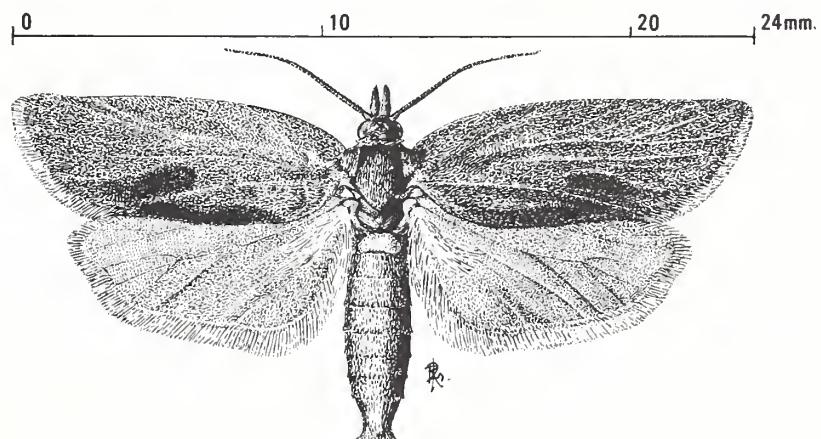
Epichoristodes acerbella distribution map (Prepared by Non-Regional Administrative Operations Office and Biological Assessment Support Staff, PPQ, APHIS, USDA).

Characters

ADULTS (Fig. 1) - Wingspan 14-24 mm (European and Mediterranean Plant Protection Organization 1979). Color variable. Forewing pale ochreous with two ferruginous marks on edge of lower margin (Gunn 1931). Hindwing grayish white, distinguishing this

species from another pest of carnations, a similar tortricid moth Cacoecimorpha pronubana (Hübner) with orange-red hindwings (European and Mediterranean Plant Protection Organization 1979). E. acerbella abdomen light brown (Gunn 1931). Male genitalia as in Fig. 2 (d'Aguilar and Deportes 1974). Male genitalia of this species and E. phaeocoma Meyrick, a closely related species, also illustrated by Clarke (1958). Female genitalia (Fig. 3).

(Fig. 1)



Epichoristodes acerbella male adult, dorsal view (From d'Aguilar and Deportes 1974).

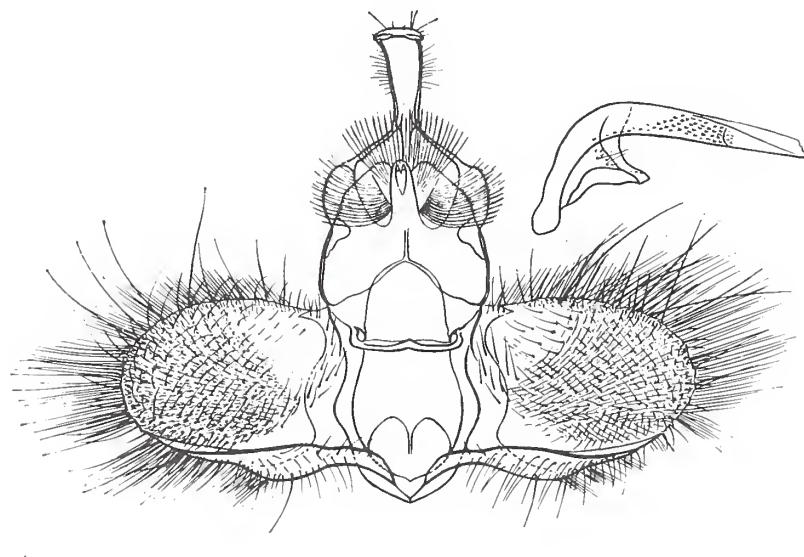
EGGS (Fig. 4) - E. acerbella light greenish-yellow to deep yellow versus C. pronubana light green to light yellow (Mayer 1967).

LARVAE* (Fig. 5) - Length up to 18 mm. Head amber overlaid with brown pattern; dark pigment at genal juncture extending about half way to ocellus 1. Prothoracic shield yellow with darker lateral and posterior margins, often with darker spot in middle. Thoracic legs yellowish, darker toward tarsi. Body

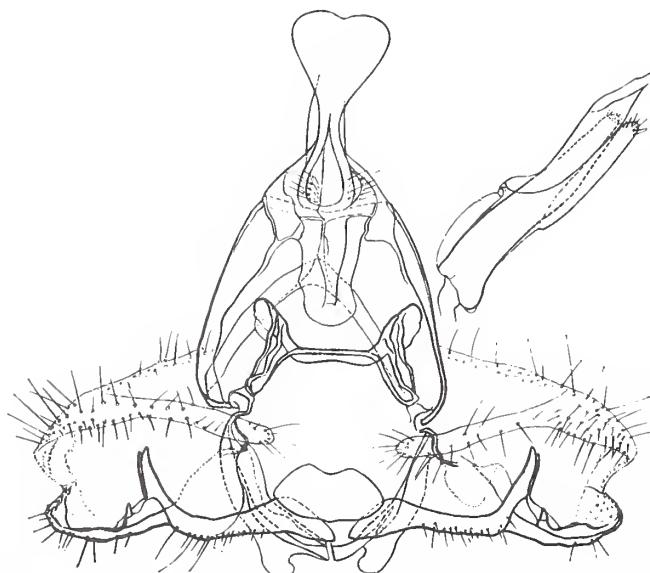
* Prepared by D. M. Weisman, Systematic Entomology Laboratory (SEL), Insect Identification and Beneficial Insect Introduction Institute (IIBIII), Agricultural Research Service (ARS), USDA, c/o U.S. National Museum of Natural History, Washington, DC 20560

color pale (in living larvae green with darker median dorsal line and lateral yellow lines). Pinaculi and anal shield pale. Spinules dark on dorsum to spiracles except for line through setae D1 and D2. Anal fork well developed with 7-8 spines.

(Fig. 2)



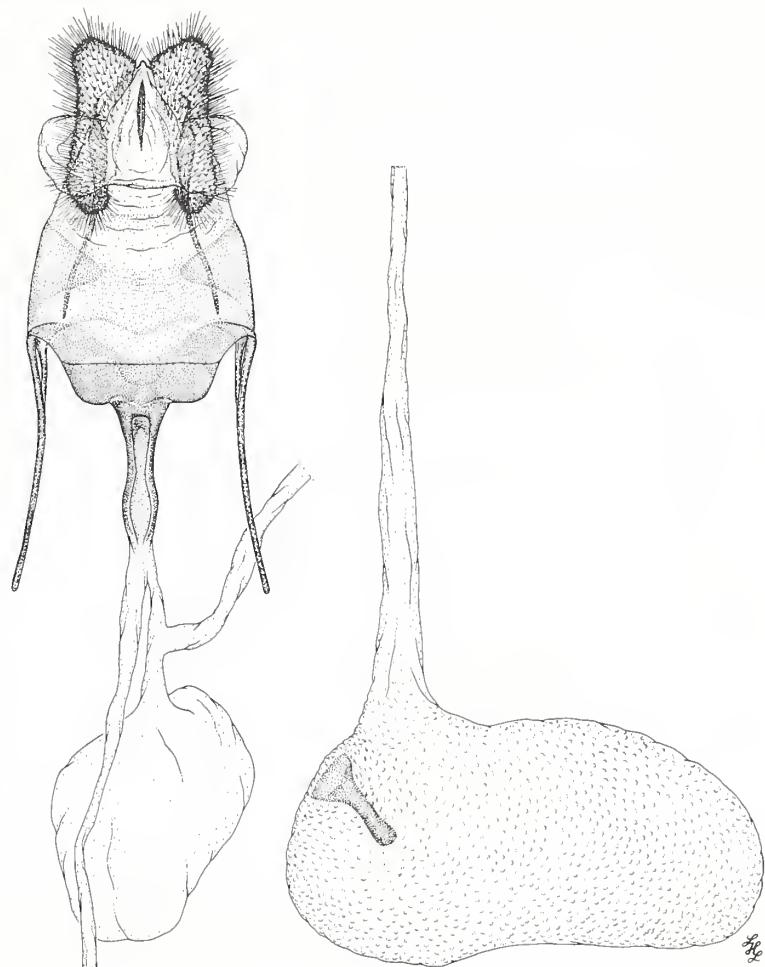
A



B

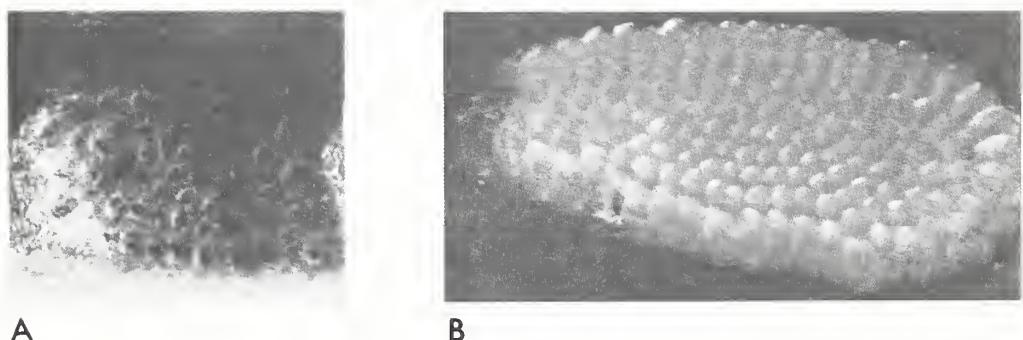
Male genitalia, ventral view. A. *Epichoristodes acerbella*.
B. *Cacoecimorpha pronubana* (From d'Aguilar and Deportes 1974).

(Fig. 3)



Epichoristodes acerbella female genitalia, ventral view
(Courtesy SEL, IIBIII, ARS, USDA. Drawn by L. H. Lawrence).

(Fig. 4)



Eggs, dorsal view. A. Epichoristodes acerbella.
B. Cacoecimorpha pronubana (From Sola 1974).

Larval head with ocellus 2 closer to ocellus 3 than to ocellus 1. Prothorax with prespiracular setae almost in line, seta L1 closer to seta L2 than to seta L3. Abdomen with spiracles on segments A1-7 a little larger than insertion of seta SD1, rim black; subventral setal formula on segments 1, 2, 7, 8, and 9 is 3, 3, 3, 2, 2; on segment A9, setae V1 distinctly farther apart than those on segment A8. Anal shield strongly tapered. Abdominal prolegs with about 40 crochets, biordinal or irregularly triordinal on posterior margin.

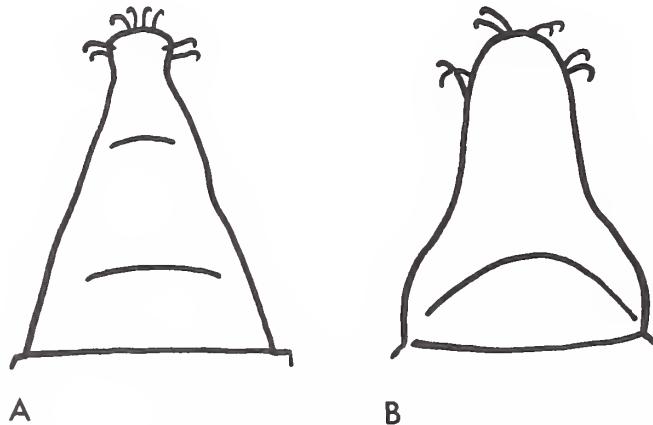
(Fig. 5)



Epichoristodes acerbella larva (From Sola 1974).

PUPAE - Dark brown, dullly shining. Abdominal segments with two dorsal transverse ridges of short projections (Taylor 1957). Cremaster caudally truncated with 1 group of 4 hook-shaped setae, laterally with 2 hook-shaped setae each (Fig. 6A). *C. pronubana* cremaster (Fig. 6B) caudally rounded with 4 groups of 2 hook-shaped setae (Mayer 1967).

(Fig. 6)



Pupal cremasters, dorsal view. A. Epichoristodes acerbella. B. Cacoecimorpha pronubana (From Mayer 1967).

Characteristic
Damage

On carnation cuttings, young leaves are perforated and wilted, and stems are mined (Fig. 7A); flower buds are also perforated (Fig. 7B) and desiccated, and petals are often woven together by silk. Greenish larval excreta may be found in and on affected stem tissues. With chrysanthemums, leaves (not stems) are mined (European and Plant Protection Organization 1979).

(Fig. 7)



A



B

Epichoristodes acerbella larval damage to carnation.
A. Perforated leaves and mined stems (From Sola 1974).
B. Damaged buds (From Gunn 1926).

On pear fruits, injury appears on the surface, particularly near the calyx ends. Damage to the cheeks occurs where two or more fruits touch or where leaves are webbed against the fruits (Fig. 8). Injury seldom penetrates as deeply as 3.2 mm, usually less. The injured area can be as small as a pin prick but often extends over as much as 6.5 sq cm. Pears damaged early in the season become malformed (Fig. 9) (Basson and Myburgh 1960).

Detection
Notes

Movement of cut flowers or other plant materials could introduce Epichoristodes acerbella into new areas. PPQ has intercepted this pest on cut flower shipments of carnations and chincherinchee from South Africa. This species was intercepted four times in Dianthus sp. in baggage in 1974 and once in Ornithogalum sp. in mail in 1975.

(Figs. 8-9)



8



9

Epichoristodes acerbella: 8. Leaf attached to fruit by larva.
9. Malformed pear (From Basson and Myburg 1960).

Entry of cut flowers is regulated under Title 7, Part 319.74 of the Code of Federal Regulations. Imported cut flowers are subject to inspection and treatment as may be required by inspection findings. The pest could also be moved on shipments of fruits and vegetables or nursery stock. These materials are regulated under Title 7, Part 319.56 and Part 319.37, respectively, of the Code of Federal Regulations.

E. acerbella may be detected in the following ways.

1. Watch for adults resting on the foliage of trees, shrubs, and hedges.
2. Inspect for clusters of eggs on leaves, usually on the upper surface (Gunn 1931).
3. Examine carnation cuttings for perforated leaves and particularly for mining in the stem tips by larvae.

4. Inspect flower buds for silken webs, and packaging material for larval excrement.

5. Inspect nurseries during the growing season before dispatch of cuttings (European and Mediterranean Plant Protection Organization 1979).

Suspect adult specimens should be pinned and labeled for subsequent identification. Submit suspect larvae or pupae in alcohol for identification.

Biology

In Italy, Epichoristodes acerbella has four generations a year in the field and five to six in the greenhouse. The generations are difficult to distinguish because all stages are present for most of the year (Nuzzaci 1973). At 11 and 17° C, development from egg to adult takes 170 and 70 days, respectively. At 13-25° C (average 20° C), total development lasts 40 days (European and Mediterranean Plant Protection Organization 1979). There is no winter diapause (Albajes et al. 1979). Under a constant 7° C, eggs neither hatch nor larvae develop but will survive for more than 300 days (European and Mediterranean Plant Protection Organization 1979).

The nocturnal adults are attracted to bright lights during the summer, preferring to hide in the foliage of trees, shrubs, and hedges during the day (Gunn 1931). In Italy in the field and in the laboratory at 25° C, females began to oviposit 24 hours after mating, and each laid 200-240 eggs on carnation leaves in three batches over 3 days (Zangheri and Cavalloro 1971). In South Africa, eggs are deposited usually on the upper surface of the leaves (Fig. 10). A few eggs are occasionally laid on the flower buds (Gunn 1931). The number of eggs in a cluster varies from 10 to over 60. In the greenhouse in Italy, the egg stage lasts 10-12 days in spring, 7-9 in summer, and 25-40 in winter.

In South Africa, the newly hatched larva begins to feed upon a leaf, mainly the upper surface, near the base (Gunn 1931) but soon burrows into a shoot or occasionally into the node of a stem; it also binds together several leaves for protection from heat and enemies (Gunn 1926). Oosthuizen (1936) reported that the larva bores either through the petals or sepals or between the sepals and bracts and attacks the whole bud; as many as five half-grown larvae feed in one bud. The larval stage varies from 24 to over 40 days according to climate (Gunn 1926).

(Fig. 10)



Epichoristodes acerbella egg clusters on upper surfaces of carnation leaves (From Gunn 1926).

Fully developed larvae then spin a cocoon either at the top of its burrow or between webbed leaves (Gunn 1926) or sometimes in the hollowed-out flower buds (Fenili 1977). In Italy, the pupal stage lasts 8 days (Zangheri and Cavalloro 1971).

Adults emerge in the greenhouse in Italy between the end of July and mid-August. They live 14-18 days. Adults of subsequent generations appear in mid-September, from mid-October to the following March, and in mid-June with the last two generations overlapping. The life cycle of the four generations lasts 71, 81, 187, and 202 days, respectively. On carnations grown entirely in the field, where cultivation begins in early September and flowers are produced from the following summer until mid-autumn, E. acerbella produces three generations, lasting 253, 95, and 107 days, respectively. Eggs of the first generation are laid in early October and hatch in November. Larvae feed continuously but slowly and give rise to adults in late April; adults of the second generation emerge up to the end of July; the overlapping third generation begins with eggs in early July and ends with adult emergence at the end of October (Fenili 1977).

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